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Multi-Yard Gardens In Iran: A Unique Architectural Phenomenon

Jardines de varias yardas en Irán: un fenómeno arquitectónico único

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Abstract

The art of gardening in Iran dates back to the second millennium BC. Iranians have long paid particular attention to combining architecture with the natural environment, and Iranian gardens are clear examples of this combination. This research aims to study and analyze a unique species of Persian garden called multi-yard gardens. These gardens have introduced a new aspect of Iranian landscape architecture. The research method in this research combines library studies with description, analysis, and comparison of the studied samples. Four examples of Iranian multi-yard gardens have been studied, of which, unfortunately, two have been almost destroyed in recent years, but sufficient information for their analysis has been recorded in historical documents. One of the actual results of this research was the analysis of spatial geometry and movement system in this type of Iranian garden in which privacy and view system are designed creatively.

Keywords: Multi-yard garden, Persian garden, Iranian architecture, Landscape architecture, Garden history.

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Resumen

El arte de la jardinería en Irán se remonta al segundo milenio antes de Cristo. Durante mucho tiempo, los iraníes han prestado especial atención a combinar la arquitectura con el entorno natural, y los jardines iraníes son claros ejemplos de esta combinación. Esta investigación tiene como objetivo estudiar y analizar una especie única de jardín persa llamada jardín multipatio. Estos jardines han introducido un nuevo aspecto de la arquitectura del paisaje iraní. El método de investigación en esta investigación combina estudios de biblioteca con descripción, análisis y comparación de las muestras estudiadas. Se han estudiado cuatro ejemplos de jardines de varios patios iraníes, de los cuales, lamentablemente, dos han sido casi destruidos en los últimos años, pero se ha registrado información suficiente para su análisis en documentos históricos. Uno de los resultados reales de esta investigación fue el análisis de la geometría espacial y el sistema de movimiento en este tipo de jardín iraní en el que la privacidad y el sistema de vistas se diseñan de forma creativa.

Palabras clave: jardín de varios patios, jardín persa, arquitectura iraní, arquitectura paisajista, historia del jardín.

1. Introduction

The Persian garden is one of the oldest and most essential gardens globally, and it has been talked about a lot in Greek writings and Torah. Iranian garden as a type of Iranian extroverted architecture, in the logic and principles of space formation, has a close relationship with introverted (courtyard) architecture. We observe that the Iranians have designed a paradise in this world (garden) that corresponds to the characteristics of this world (evolution), but the images of the paradise evoke the hereafter and have tried to be elegant and productive in all seasons of the year (fruits of the regions). Different climates in the year's four seasons are in a closed ecosystem and separate from the environment (Diba & Ansari, 1995).

The Persian garden was not merely aesthetic; rather, it was an integral part of the agricultural economy with all its characteristics. In the Middle Ages, the Persian garden was considered an immovable property and was often dedicated and used in the service of religious institutions. Because it was wholly supervised in terms of irrigation, the garden in Iran was used as a laboratory for botanical experiments and the exploitation of new plants. For this reason, the garden was a manifestation of farming that relied entirely on irrigation, as was done in Iranian agricultural units.

Some features of the Persian garden have not changed from ancient times to the present day. One of the most critical features, which deserves some attention, is that the Persian garden was an enclosed and walled environment. The entrance to the garden was through a door that could be locked with a key. The walls prevented the entry of aliens and especially protected streams and streams, without which the garden would not have been possible(Subtelny, 2008).

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Most scholars emphasize that "in the Iranian garden, the ultimate material is elevated to the infinite spiritual. The garden is formed as simple and clear as possible and leaves no corporeal ambiguity in the relationship between man and space" (Mir Fendereski, 1995).

Because "Iranian garden has both physical and spiritual experience. The scent of lush plants, the sound of water and birds, the smooth tile texture and moist ground, the taste of sun-dried fruits, and the view of colorful flowers and mosaics reflected in the mirror of the quiet ponds are highlighted. "These features exist simultaneously at the most symbolic and abstract level and the most direct empirical level" (Herdeg, 1990, p. 49).

Multi-yard gardens in Iran are among the exceptional cases in gardening, and so far, insufficient researches have been done about them. In this research, four examples of these gardens have been studied and analyzed regarding spatial geometry and circulation system. The results of this research are essential in the history of landscape architecture.

2. Methods and Materials

2.1. Methods

In order to study the cultural and environmental foundations in Iranian gardens, first, the descriptive-analytical method will study the structural and physical elements in Iranian gardens (Moghaddasi, Moghaddasi, & Khalilabad, 2020; Shahidi, Bemanian, Almasifar, & Okhovat, 2010).

In general, the method used in this research is descriptive-analytical and descriptive-comparative, which are divided into two general groups: library studies and field studies. Library studies include historical documents, aerial photographs, and documentary information about these gardens, which are available in the archives of the Cultural Heritage Organization. Since some of these gardens are on the UNESCO World Heritage List, the resources and documents from this garden are sufficient and available. Reviewing articles and results obtained from previous research in this garden or similar research is crucial in library studies. Therefore, for the historical study in this research, to know the conditions and changes of the past by referring to the documents and maps in the archives of the Cultural Heritage Organization and other reliable sources, the desired information is collected. After studying the evidence, the observations are described and is analyzed.

2.2. Multi-yard Gardens

In the study of Iranian gardens, we encounter different categories, some of which have considered the garden's function, (H. Soltanzadeh, 2003) and others have considered the physical structure of the garden as a criterion. In the structural and physical study of some, they have studied the slope of the ground and the steppedness of the garden and have achieved the structure of the flat garden (Baghe Takht). Hence, there is less research in recent years that has classified the garden yard as a criterion for structural analysis. In the study of open spaces (courtyards) in Iranian gardens, we noticed a fundamental point in this garden with several similar gardens that offer a new definition of the structure of

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the Iranian garden. According to this definition, "multi-yard gardens" refer to gardens whose open space (yard) is not integrated and is separated by elements such as a wall, mansion, or pavilion and define a separate enclosed space. The fronts and entrances in front of the gardens, which follow a U-shaped structure, are not defined as courtyards. According to this definition, gardens such as Fin in Kashan, Chehelston in Isfahan, Hasht Behesht, Eram in Shiraz, Golshan Garden in Tabas, Ghadmagah in Neishabour, and the like are classified as "single yard gardens." A significant point about multi-yard gardens is the precise definition of the outer and inner space of the garden. The mansion, which acted as a filter, was separated from the outer courtyard. In line with this definition, gardens that were structurally identified as several yards (having separate indoor and outdoor spaces) were selected based on the availability of sufficient study resources to explore them. Thus, four gardens were selected for the study and structural analysis of this research: Qajar Palace Garden in Tehran, Takht Garden of Shiraz, Fathabad Garden in Kerman, and Shahzadeh Mahan Garden. In the continuation of the discussion, we will introduce and analyze these gardens.

2.2.1. Qajar Palace Garden in Tehran

When Fath Ali Shah completed the construction of Qajar Palace, it became the most magnificent in the gardens of that era, but it was abandoned about half a century later, and swallows took refuge in it instead of pretty women. Now this palace is destroyed. It was located 4 km north of Tehran on the right side of the first road of Shemiran, and thousands of foreigners see it, while few of them are aware of the importance of this building.

As the redesigned plan shows (Figure 1), the first plan consisted of a vast space on relatively flat ground and an enclosed building with porches built on a steep slope. At the bottom of the palace garden, which was arranged in a stepped style, a large pool was built like an artificial lake; In fact, the design of this garden used both a stepped design and an artificial lake like Shah Goli Garden near Tabriz and Takht Shiraz Garden(Wilber, 1969, p. 196).

In 1930, the land in this area was used to build a model prison in Tehran, while the upper building lasted until 1950 when bricks and stones were looted for nearby buildings. If we want to see this garden as it was a century ago, we must use the plan drawn around the area based on several reports.

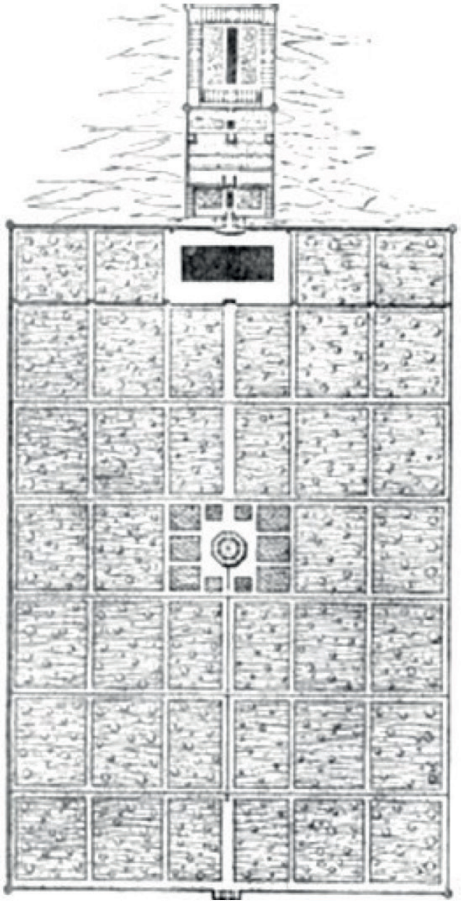

Figure 1: Redesign of the main building of Qajar Palace in Tehran. (Wilber, 1969)

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It seems that this plan, with full fidelity, reflects the original condition of the twenty-acre area. A person who visited the area early on describes how it was paved: "Streets were built parallel to each other where black poplar and willow trees and a variety of fruit trees and rose bushes were planted in abundance." In the middle of the garden was a majestic pavilion made of green marble and brick, covered with tiles. (Figure 2,3)

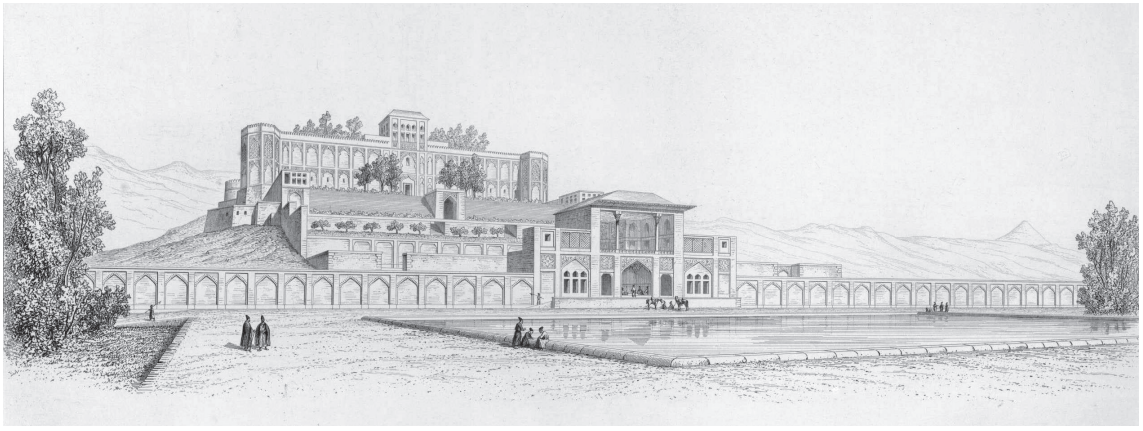

Figure 2: Engraving - Qajar Palace Royal Porch and Hall from "Coste" (Coste, Beaufort d'Hautpoul, Coste, & Sauvageot, 1867; Zangheri, Lorenzi, & Rahmati, 2006)

Figure 3: Lithography - Central pavilion in the main garden of Qajar Palace (Flandin, 1851)

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At the northern end of the garden was a gate that was the entrance to the garden and was guarded by a guardian, and on this entrance, there was a large hall which was decorated with painted curtains; Porches or outbuildings were cut off everywhere by streams of water; The fifth porch led to the ruler's private residence. Numerous rooms surrounded the courtyard, and much of the courtyard space was occupied by pools full of water, which were very pleasant. The rooms on the upper floor were reserved for the king, especially a room decorated with ebony, ivory, mosaic, and tile painting. From this place, the view of Tehran was visible from afar; the city of Rey and the holy shrine of Shah Abdolazim could be seen with its dome, especially before sunrise when the sky turned golden and red, and long shadows spread several miles across the earth and countless columns. The smoke was scattered vertically in the clear air, and this place had a unique view. The other rooms were reserved for royalty ladies. Each of these rooms was about four square meters in size, and a massive wooden bed took up almost all of its space. Most of the walls of these rooms were decorated with relatively well-painted paintings.
Some of these paintings showed the kings and historical and legendary heroes of Iran. The image of several women in European clothes and some foreign delegations was also seen in Iran, which was part of the recent group of full-length images of a British man named Strachey, whom the Iranians called Istarji. Fath Ali Shah Qajar was so fascinated by this man that he wrote a poem for him. The life of this poem was longer than the life of a painting that showed Strachey in an aristocratic uniform and knee-length trousers and a sword(Wilber, 1969, p. 203). (Figure 4)

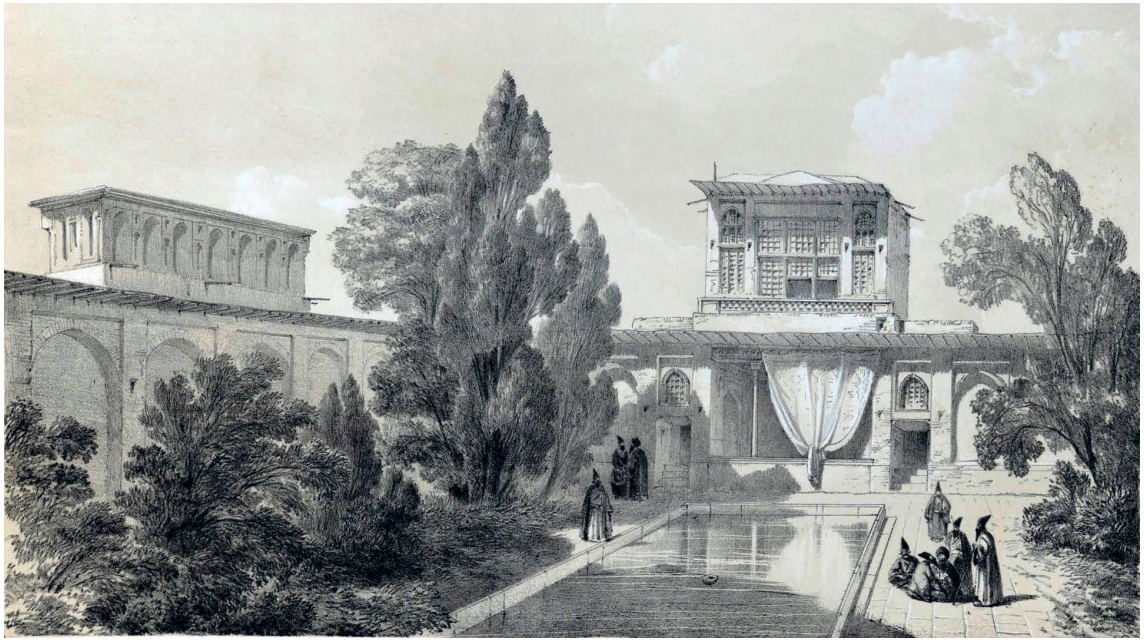

Figure 4: Private garden in the garden of Qajar Palace of Tehran. (Flandin, 1851; Naeema, 2007, p. 237)

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2.2.Takht Garden of Shiraz

Around 1665, Jean-Baptiste Tavernier described a garden called the "Garden of Eden," which is similar to this place. Tavernier writes: "Outside the city in the northern part of the mountain is a place that belonged to the ancient kings of Iran. It is called Ferdows Garden. It has many fruit trees and many rose bushes. At the bottom of the garden is a large building, the water of which is supplied by a large pool built below" (Tavernier, Phillips, Littlebury, Pitt, & Starkey, 1678).

In 1705 Cornelis de Bruyn wrote about the pleasure palace of Ferdows (Bruyn, 1718), but a hundred years later, the name of the Qajar throne was given to this garden, and at that time, its construction was attributed to Mohammad Shah Qajar, king of the Qajar dynasty, in 1789. On the left side of this area, they have created an enclosure for all kinds of games, including playing with mountain goats. It was in an unknown history after 1850 that it was given its current name, the Garden of Thrones.(Figure 5)

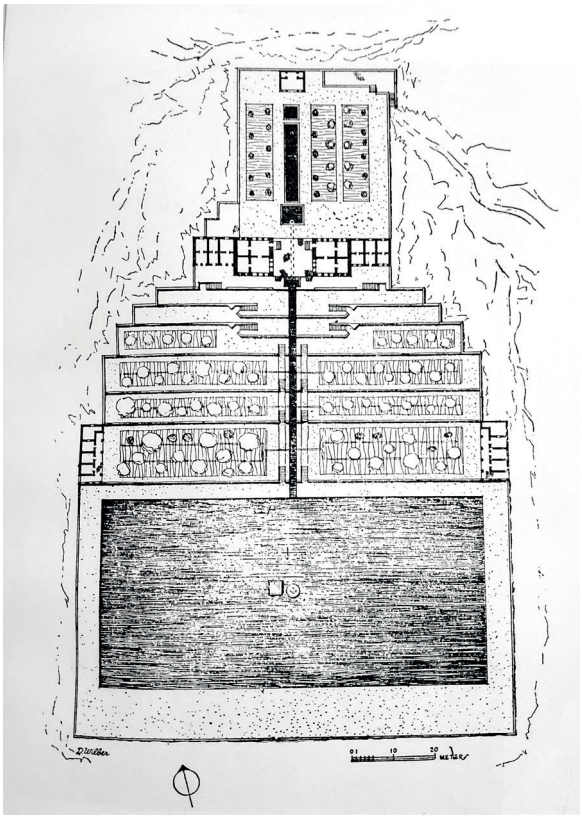

Figure 5: Redesigned plan of Takht garden of Shiraz. (Wilber, 1969)

A photograph was taken about a century ago - in the late 1910s - shows the garden in ruins, which have since been rebuilt in ruined high-rise buildings. (Figure 6)

Figure 6 :Takht Garden of Shiraz, this photo was taken in the early 1910s. (Wilber, 1969)

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Figure 7 showed the place in 1945, but its large pool is now dry and empty, and even today, when the garden is ruined, it is still interesting because it is a perfect example of a garden with spring and its water—gathered in a large pool. Such pools were called lakes or small seas and made them as large as possible. The descriptions of such pools confirm that they had small boats and that their proud owners boarded these boats and left the dry shore behind(Wilber, 1969, p. 232).

Madame Dieulafoy[1] visited Shiraz in 1881 (1261 A.H.), describing the Takht garden of Shiraz: "This garden was very clean and lively. Orange and lemon trees are stacked on top of each other with that magnificent view, and yellow and white rose bushes, and it has interestingly decorated the garden"(Dieulafoy, 1887).

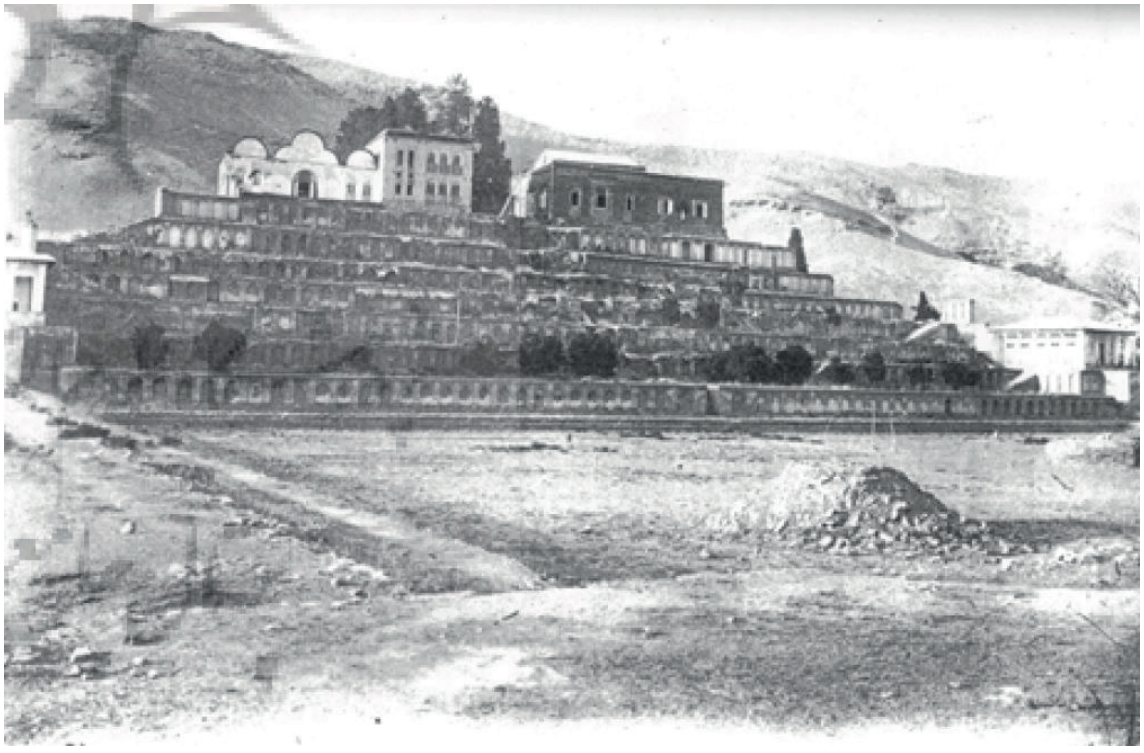

Figure 7: Takht Garden of Shiraz, in 1940s. (Zandieh & Arabsolghar, 2013)

Abraham Jackson[2], an American orientalist, writes in 1903: "Gardens on both sides surround the main road leading from the Allah Akbar Strait to Shiraz. Among them are Haft Tan and Chehel Tan on the east side, which is the meeting place of their dervishes. On the west side, there is a similar area, one of the most interesting of the Takht Garden, which I especially visited. This garden is located on a high place overlooking the city,

1 Jane Dieulafoy

2 Abraham Valentine Williams Jackson

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northwest of Shiraz, and on the old buildings, King of Qajar has built a new building. The garden consists of several rows and surfaces on top of each other, and the springs and streams pour their water in a small way on the waterfront of flowing marble and into a large stone pool. Carved stones have been placed along the streams, and cedar and orange trees have adorned the sidewalks and garden corridors. The walls around the courtyard and the stairs of the plateau are not intact and are in ruins. It remains to tell the beauty of the past"(Jackson, 1903; Sami, 1984, p. 677).

According to Cherikov's map of Shiraz, it can be said that the southern part of the garden (lower garden) was larger than that shown in Wilber's plan and had a middle path as well as plots on both sides. The garden probably had a garden or a small reading area in front of the entrance. With this information and with the help of the aerial image of the current condition of the garden, a hypothetical horizontal image of the garden can be drawn (Mehryar, Fathollayef, Fakhari Tehrani, & Ghadiri, 1999). (Figure 8)

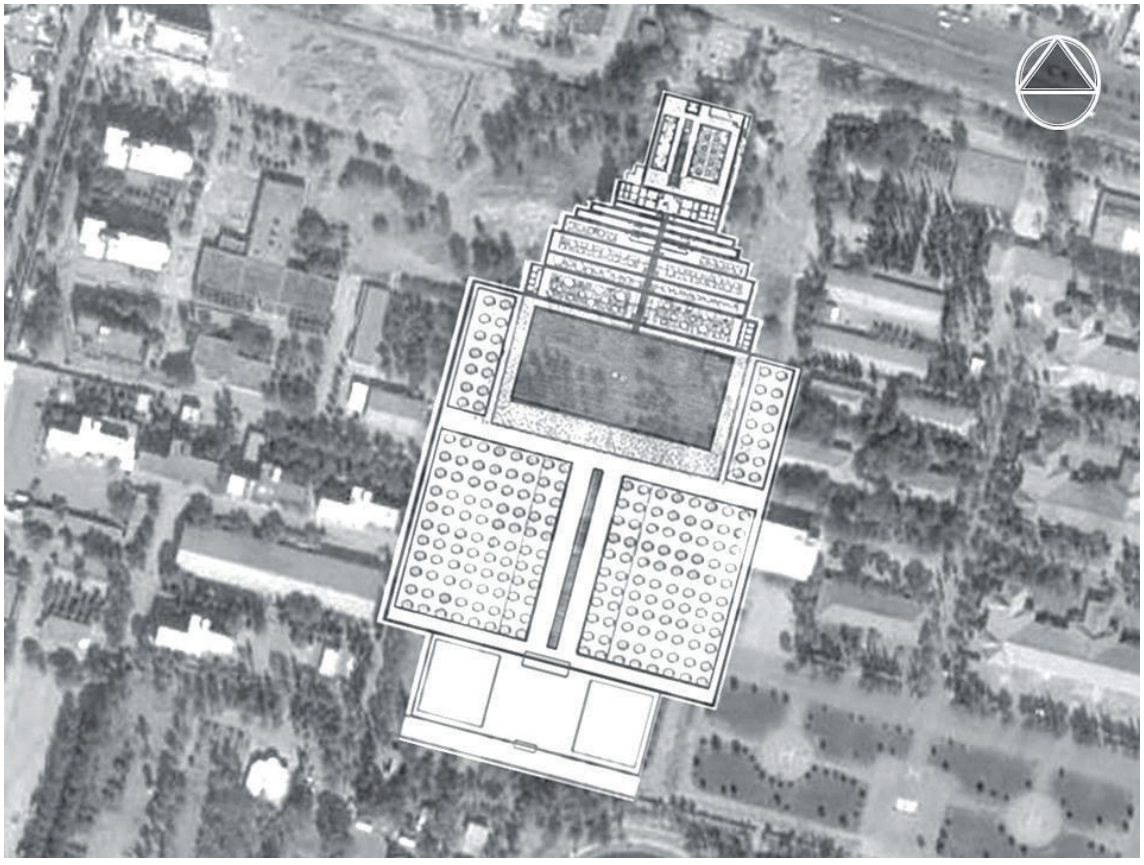

Figure 8: Hypothetical plan of Takht garden of Shiraz(Alai, 2010)

The southern part of the Takht garden is almost square with dimensions of about 150 × 150 meters and 2.3 hectares. The middle and northern part of the garden is 50 × 100 meters and has about half a hectare area. This garden, like Eram Garden, has a main

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axis of movement that runs parallel to the longitudinal and in the middle of the garden width. Of course, this axis is not as strong and important as the longitudinal axis of Eram Garden. This longitudinal axis is defined by the middle street, the entrances, and the mansions on the hill. The longitudinal axis of the garden has an angle of 15 degrees with the north/south direction and is in the northeast/southwest direction. The garden has almost no side axis; the only side axis that can be imagined for the garden is on the first platform of the garden after the waterfront or the large middle lake, which is marked by two mansions on its sides. (Figure 9)

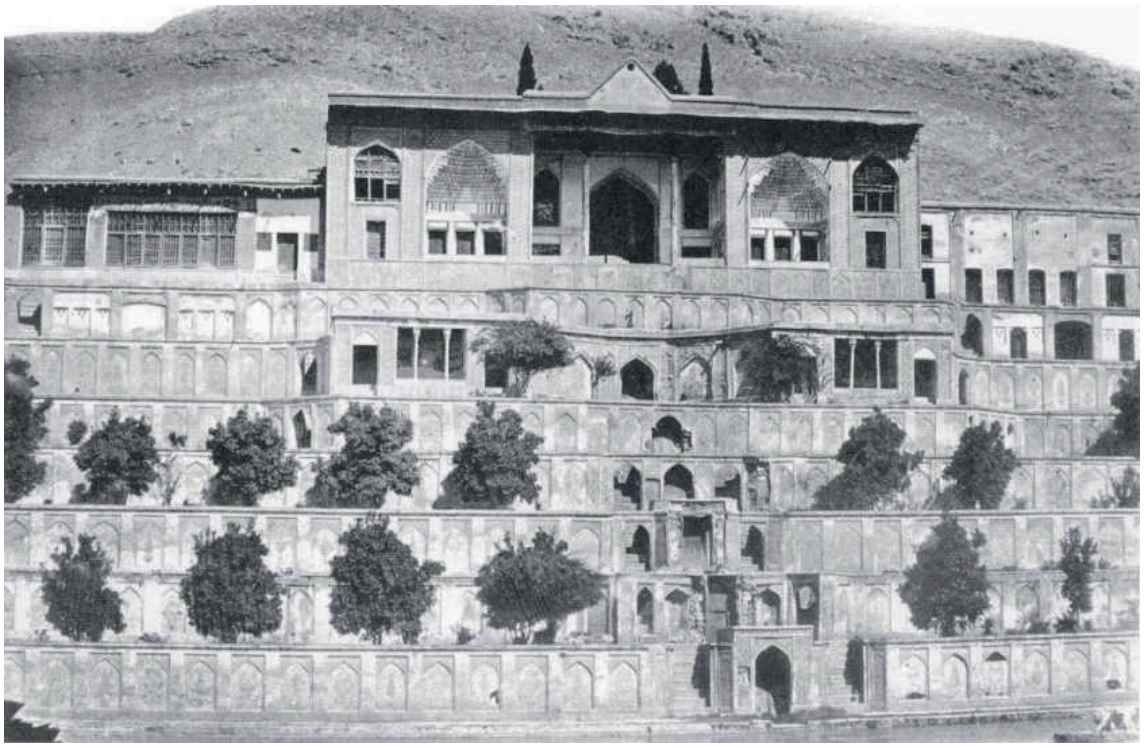

Figure 9: Platform and side building of Takht garden of Shiraz (Semsar & Saraeian, 2003)

As it is stated, the Takht garden is flat. Apart from the southern part of the garden, which is relatively flat, the middle part of the garden consists of seven flat platforms. The northern and end parts of the garden are built on a natural hill above the middle part on a platform. The height difference between the highest (flat surface on the hill) and the lowest part (southern garden level) is about 20 meters. The main entrance to the garden is on the southwest side, along the longitudinal axis of the garden. The other entrance is on the other side of the longitudinal axis of the garden from which they enter the mansion on the hill.

The Takht garden had at least three mansions: the main mansion, which is a building with a middle courtyard on top of a hill at the end of the longitudinal axis of the garden, and two middle mansions on either side of the first platform and the wide middle section of the garden (Figure 5). They can look at the middle floor surfaces of the garden

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and each other and the lower and upper parts of the garden. Perhaps such an experience in the garden view is unique to the garden of Takht Shiraz. The southern part of the main building is a building stretched parallel to the flat platforms; the middle part has two floors and a porch in the middle. This section has changed a lot over time, and differences can be seen in the various images that remain. The main front of this building faces south, towards the flat surfaces and the southern part of the garden and plain of Shiraz. In addition to this mansion, the middle floor platforms and the spaces that can be seen in various places overlook the lower courtyard of the garden and the large waterfront (lake), and the Shiraz plain. A scenic experience of this quality can perhaps be found in the Qajar Palace in Tehran. In the garden view from the bottom to the platforms, trees on different floors can be seen regularly, making this garden a suspended garden. The image of these platforms and the main garden mansion is reflected in the large waterfront (lake) at the bottom of the garden, making the complex even larger and more magnificent(Alai, 2010).

2.2.2.1. Private garden

The "Private garden" is the only remaining part of the Takht garden complex, which, of course, has undergone many changes. Clear maps and images from the past of this section are not available. Therefore, it cannot be analyzed with confidence, but some of its features are still known and can be the basis of description and analysis.

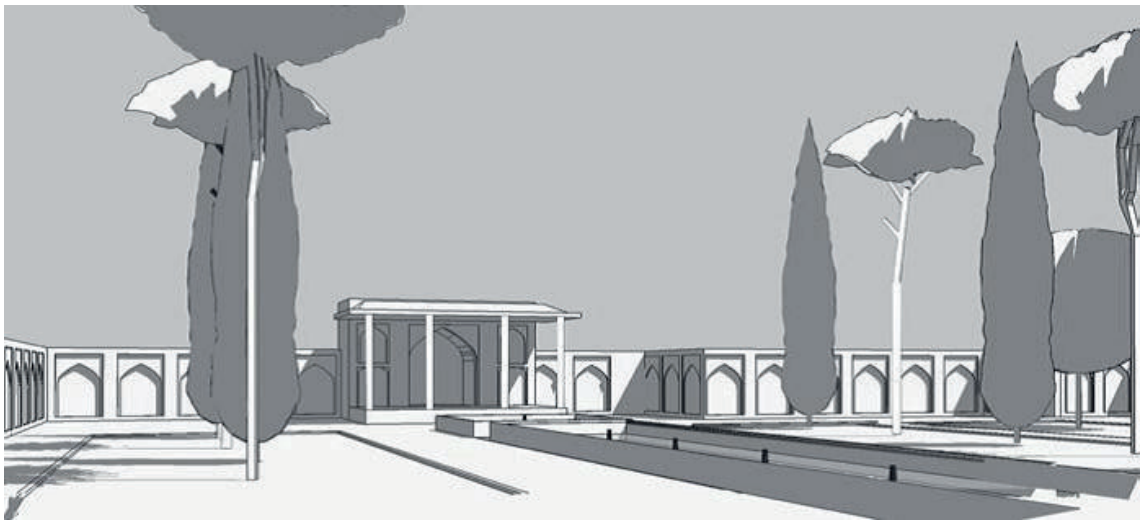

Figure 10: Representation of a part of the backyard garden and the imaginary image of the garden pavilion. (Khoei & Garavandpoor, 2011)

The "Private garden" was the smallest area of the Takht garden. It was located at the highest point of the complex, and in this respect, it was considered the dearest part of it. The main building of the "Private garden" was the "Shahneshin[3]" mansion. "Shahneshin" belonged to both "Private garden" and "steppedness garden.".

3 The place which Shah (king) resides.

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According to Wilbur's plan, a waterfall was in the middle of the "Private garden." The water of this fountain was probably the most untouched water in the flat garden, compared to the ponds and streams downstream. It seems that the upstream water first appeared in this water feature. This adds to the privilege of the "Private garden .[4]" (Figure 10)

The main building of the "Private garden" was the "Shahneshin" mansion where the owners of the complex lived. In this way, the "backyard garden" became a personal and family privacy. The application of the name "Private" to this part of the Takht garden in the sayings of tourists confirms this feature. The bath in the southwest corner of the "Private garden" leaves no doubt that this garden was inhabited (Khoei & Garavandpoor, 2011).

2.2.3. Shahzadeh (Prince) garden of Mahan

Figure 11: An old image of Shahzadeh garden of Mahan, which also mentions the unfinished entrance.(Shahcheraghi & Javaherian, 2004)

4 With the pictures of the garden, not much information can be found about the northern pavilion of the garden. An imaginary pavilion image has been drawn based on the same limited information and images available from the pavilions corresponding to that information.

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In the vast desert at the hillside of the Joopar Mountain, there is a place from which water flows for agriculture in the lands of Mahan village. The Shahzadeh garden of Mahan, near the shrine of Shah Nematullah Vali by the efforts of Abdul Hamid Mirza Nasser Al-Dawlah Farmanfarma, during the eleven years of his rule (1309-1298 AH) in Kerman and Sistan provinces, with the ability of gardeners and architects as well as thought thinkers familiar with the ancient and rich culture of Iranian gardening were created with a magical quality(Mir Fendereski, 2004, p. 190). Nasser al-Dawla Farmanfarma died in Kerman before the garden was completed due to illness. (Figure 11).

However, despite the unfinished garden structure, the grandeur and coherence of the flat-garden structure depend on its main axis, which is composed of organs; Including frequent waterfalls, ponds, rows of trees, canopies and fountains with high water jumps, it had created a unique splendour even before sufficient and considerable plant growth in the garden. Ms Ella Sykes, sister of the British Consul in Kerman (1905-1895 AD) When the shade trees of Shahzadeh garden of Mahan were about ten years old, she was fascinated by the central axis, the long slope of the garden with "brilliant and astonishing flow of water, broken by waterfalls Lively and adorned with tall fountains and rising to the sky and the August sun shone in the bubbles of the fountains, with all the colors of the rainbow." she describes(Sykes, 1910).(Figure 12)

Figure 12: An old image of Shahzadeh garden of Mahan where the quality of waterfalls and fountains can be clearly seen. (Shahcheraghi & Javaherian, 2004)

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In all its features, the Shahzadeh garden of Mahan follows the systems and rules of the Persian garden when most scholars recognize it as a time away from attention to originality, historical values and the beginning of the decline of the art of creation in Iran[5].

Prince Mahan Garden is one of the examples of Persian flat gardens that have made the most favourable natural conditions. The presence of fertile soil, necessary sun, soothing wind and breeze, and finally access to water has made it possible to create a garden on that scale in a dry and waterless area and miraculous grass. (Figure 13)

Figure 13: High walls protected aerial view of Shahzadeh Garden of Mahan from the dry and damp environment around it. (Khansari, Moghtader, & Yavari, 2004, p. 18)

The location of the garden on a sloping ground that can create a flat garden caused this earthly paradise to be built as a flat garden(Vaziri Kermani & Bastani Parizi, 1962).

The garden buildings are the main pavilion, i.e. the permanent residence located at the upper end of the garden. The entrance mansion occupies the garden entrance in a linear structure at the entrance of the garden and is built on two floors. The upper floor has rooms designed for living and dining. Other garden service buildings have used the main fence, and as a composite wall, various service buildings have been placed in suitable

5 One scholar of the Islamic Garden writes: "Unfortunately, since the last years of the seventeenth century, the shaping of the Iranian garden according to the fundamental principles and characteristics has given way to the desire to show the true nature, and thus, as expected, a period it started with a decline. (Lehrman, 1980)

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places. The side entrances of the garden are also projected on two longitudinal sides. The landscapes of the Shahzadeh Garden, which are the main features of the Flat Garden, are best used. Endless views in the longitudinal direction of the garden from the main pavilion to other parts of the garden and vice versa from the entrance mansion give a special richness to life in the garden. The exterior landscapes of the garden, which can be seen from inside or outside the garden, show the contrast between the two environmental qualities of the garden. Arrangement of trees, proper selection of plants in creating shade and appropriate colour in different garden seasons defines exceptional values(Ilka & Ilka, 2012).

The garden consisted of similar terraces and was in the shape of a natural slope of the earth, and along its axis had a wide waterway that with each drop of water, a small waterfall was created. On either side of the canal were two sidewalks with cypress trees, creating a stunning view. A view of the main waterway of the Shahzadeh Garden from the second floor of the garden porch. (Figure 14) Sykes, who observed it shortly after its construction, wrote: "The fountains, running water and shady trees of this garden contrast with the surrounding desert, and when we entered a room in the shape of a cross overlooking the water, the whisper of the water was as uniform as the sound of sleep"(Sykes, 1910)[6].

Figure 14: View of Shahzadeh garden of Mahan from the second floor of the main pavilion along with the garden. (Photo by: Mohammad Sadegh Ebrahimi, 2018)

6 Although Ms. Sykes describes Shahzadeh garden of Mahan in great detail, Arthur Pope, who visited many buildings in the 1930s (about 20 to 25 years after Ms. Sykes), including the Takht Garden of Shiraz(Pope & Ackerman, 1981, p. 1434) and he describes them in his book; he does not mention this garden. This is while he has told the features of the tomb of Shah Nematollah Vali in Mahan in great detail, and it means that he was present in that area. (Pope & Ackerman, 1981, p. p. 1430) It seems that the garden of Shahzadeh in Mahan, like some other gardens in Kerman, did not have a favorable situation or was not considered a historical monument at that time.

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2.4. Fathabad Garden in Kerman

It is located on the outskirts of Ekhtiarabad village, 13 km northwest of Kerman, and was irrigated by the Fathabad Qanat. The original core of the garden mansions is around 1280 AH. Formed and influenced by the pristine environment around it, it flourishes day by day, and several mansions are added to it. Unfortunately, like other valuable buildings of Iran, after its formation and prosperity, it also saw a period of liberation, and with the loss of water resources necessary for the life of the garden, it declined in the last three decades, and some of its buildings were looted. The main mansion of the garden is U-shaped on two floors with two edges and is located along the elongated axis of the garden consisting of a long water feature and a row of cypress and pine trees on both sides. This axis has all the features defined for the Persian garden. (Figure 15)

Figure 15: Fathabad Garden, Kerman, front view of the main building. (Photo by: Hamid Sadeghi, 2015)

On the east side of the main mansion, there is four-season (Chahar-Fasl) mansion, which has many similarities with the Persian garden pavilion. This mansion was on a mezzanine and extroverted and had a view of its surroundings from all sides. The four-season mansion with six pine trees and its waterfront has created a new axis perpendicular to the central axis. (Figure 16) The garden has a unique functional variety throughout the year to be considered a government, residential, ceremonial or production garden.

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In a stylistic-historical view of the garden buildings, it should be noted that in Fathabad garden, like other architectural works of the Qajar period, there are signs of European architectural influence, including the half-columns and decorations of the main building and the presence of a greenhouse in the garden(M. Soltanzadeh, Keshavarz, Ashraf Ganjooie, Golchin, & Hashemi Nejad, 2014)[7].

Figure 16: Four-Seasons Mansion in Fathabad Garden, Kerman (Photo by: Iran Tourism News Agency, 2014)

At present, the general form of the Fatehabad complex is a rectangle with dimensions of approximately 260 × 440 meters, which is stretched in the southeast-northwest direction following the natural slope of the earth, and the components of the complex are located inside it. Another space, called the garden of the street in a rectangular shape with dimensions of 60 × 420 meters and the east-west direction, in the western part of the complex has been added to the central area of the complex in later periods. The central mansion (main mansion) is the essential building and the initial core of the construction of this complex, which has expanded over time, and two edges have been added to it and have a U-shaped shape. On the north side of the main building, there is an L-shaped annex known as the grain warehouse and the manager's house. This part, which unfortunately has been destroyed today, was oriented to the west of the garden, and there was a small garden in front of it. The four-season mansion to the east of the main mansion, with

7 It is located on the west side of the main building.

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its distinctive architecture, is one of the critical components of the complex. The water of Fatehabad Qanat (aqueduct) appeared on the ground a few kilometres south of the complex, and from there, it moved towards the garden by two parallel streams on both sides of a wooded street(M. Soltanzadeh & Ashraf Ganjooie, 2013, p. 43). (Figure 17)

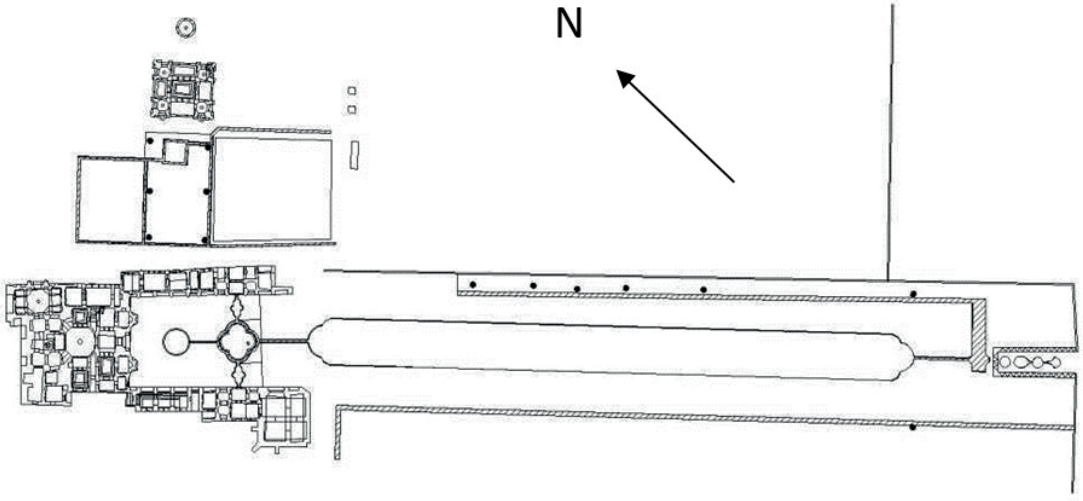

Figure 17: Plan of Fathabad Garden complex in Kerman (Source: Archive of Kerman Cultural Heritage Organization, 2002)

3. Results and Discussion

According to some researchers (Okhovat, Zamani, Amirkhani, & Pourjafar, 2010), the structural and formal systems of Iranian landscape architecture have been categorized into different categories, which can be the system of establishment, system of access and proximity to space, the geometry of space, the system of building masses in space, the system of movement in space, the system of confinement of space, the system of existence and movement of water in space, the system of planting plants in space.

However, the remarkable thing about the above titles is the importance of the movement system and geometry in space because it directly relates to vision, and the damage to Iranian gardens is examined at first glance from this feature.

In the following, we have analyzed the movement and spatial system in the four studied gardens, which are explained in the form of a table and with a graphic presentation (Tables 1 to 8):

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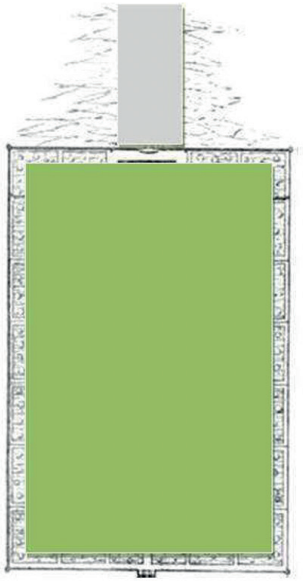
	Space Analysis	Qajar Palace Garden in Tehran	
Space Geometry	The general geometric system of space	A primary vertical axis is defined throughout the garden, most of which is located in the outer garden.	
	Architectural geometric system	The geometry of the whole set is designed in the form of two more enormous square generalities and a smaller rectangle.	
	Systematic elements of space geometry	A central pavilion in the outer garden focuses on the larger space, and two inner pavilions, one semi-extroverted and the other introverted arrange the surrounding spaces. The pool in front of the central pavilion is the first defining element of the privacy statement in the complex.	

Table 1: Analysis of the space geometry-Qajar Palace Garden in Tehran (Authors)

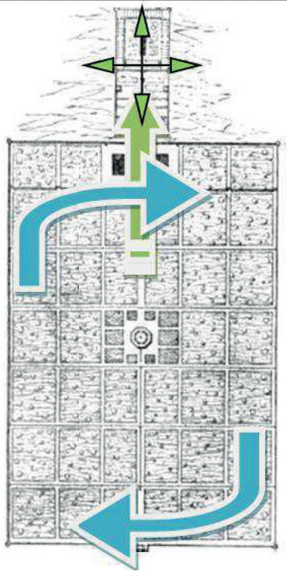
	Qajar Palace Garden in Tehran	
Movement System in Space	Moving through an ample square space (outdoor garden) and passing through several elements such as the pool and the pavilion in front of it gradually induces a sense of joining privacy. The end space with the structure of the rooms around the courtyard strengthens the audience's sense of privacy.	

Table 2: Analysis of the Movement System in Space-Qajar Palace Garden in Tehran (Authors)

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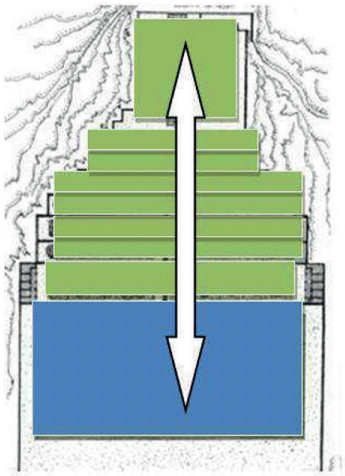
	Space Analysis	Takht Garden of Shiraz	
Space Geometry	The general geometric system of space	The main vertical axis with several horizontal sub-axes	
	Architectural geometric system	The macro geometry of the complex is influenced by the structure and stair movement, and elongated rectangles also represent its fragmented components.	
	Systematic elements of space geometry	The garden pavilions are located at the end of the central north-south axis and emphasize the presence and importance of the garden's central axis. The entrance pool also defines a public (outdoor) place.	

Table 3: Analysis of the space geometry- Takht Garden of Shiraz (Authors)

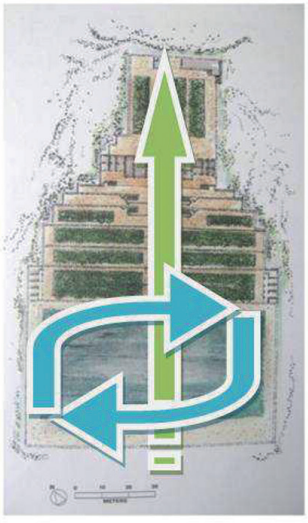
	Takht Garden of Shiraz	
Movement System in Space	Moving from an ample square space (pool garden) to narrow and elongated spaces gives the audience a sense of entering from public to private. Numerous spaces in sequence with each other as the area of each floor decreases indicate the audience to move forward.	

Table 4: Analysis of the Movement System in Space- Takht Garden of Shiraz (Authors)

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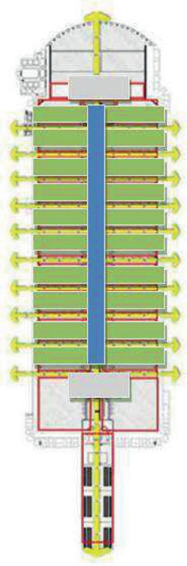
	Space Analysis	Shahzadeh Garden of Mahan	
Space Geometry	The general geometric system of space	A horizontal axis perpendicular to a set of vertical axes	
	Architectural geometric system	Quadrilateral pieces	
	Systematic elements of space geometry	Continuous quadrilateral pieces formed by the vertical axes and the main horizontal axis	

Table 5: Analysis of the space geometry- Shahzadeh Garden of Mahan (Authors)

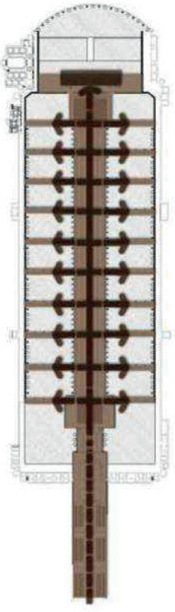
	Shahzadeh Garden of Mahan	
Movement System in Space	The exaggerated feeling of the vastness of space due to the movement on the central axis and the vast area (horizontal axis) is quite apparent. The variety of spatial quality, including successive spaces and linear perspectives, has made the complex unique.	

Table 6: Analysis of the Movement System in Space- Shahzadeh Garden of Mahan (Authors)

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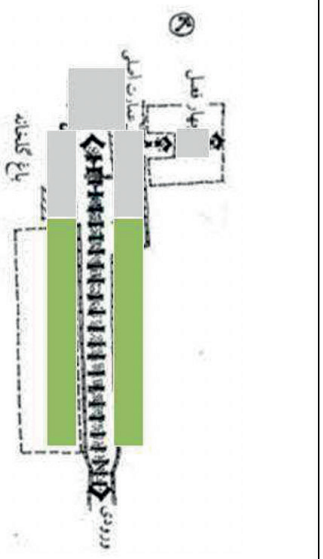
	Space Analysis	Fathabad Garden in Kerman	
Space Geometry	The general geometric system of space	A strong axis emphasizes the main pavilion and a sub-axis that leads the audience to a more private space (four-season mansion).	
	Architectural geometric system	The overall space consists of a large rectangle and a square.	
	Systematic elements of space geometry	The main pavilion is U-shaped, and the four-season mansion is located northeast of the complex.	

Table 7: Analysis of the space geometry- Fathabad Garden in Kerman (Authors)

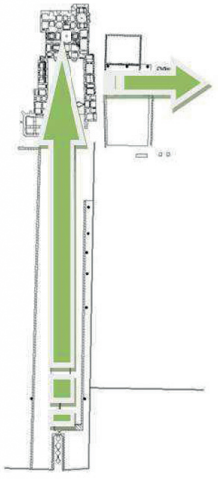
	Fathabad Garden in Kerman	
Movement System in Space	The movement in an elongated rectangular space and the U-shaped structure of the main building induces a sense of security. Then, turning 90 degrees and entering a completely private space (four-season mansion) with the trees in front of the mansion creates a kind of intimacy.	

Table 8: Analysis of the Movement System in Space- Fathabad Garden in Kerman (Authors)

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